touch-sensitive screen **1400** and the inventive electrode **1404**, in case the touch-sensitive screen **1400** itself fails to provide sufficient insulation.

[0095] In addition to conventional touch-screen functionality, namely detection of approaching or touching by the touch-sensitive areas by the user's finger, the controller **1406** uses information of the position of the finger **120** to temporally vary the intensity of the electrosensory stimulation invoked by the electrode **1404** on the finger **120**. Although the intensity of the electrosensory stimulation is varied over time, time is not an independent variable in the pre-sent embodiment. Instead, timing of the temporal variations is a function of the position of the finger **120** relative to the touch-sensitive areas (here: A_1, A_2 and A_3). Thus it is more accurate to say that the present embodiment is operable to cause variations in the intensity of the electrosensory stimulation invoked by the electrode **1404** on the finger **120**, wherein the variations are based on the position of the finger **120** relative to the touch-sensitive areas.

[0096] The bottom side of FIG. **14** illustrates this functionality. The three touch-sensitive area A_1, A_2 and A_3 are demarcated by respective x coordinate pairs $\{x_1, x_2\}$, $\{x_3, x_4\}$ and $\{x_5, x_7\}$. Processing in the y direction is analogous and a detailed description is omitted. The controller **1406** does not sense the presence of the finger, or senses the finger as inactive, as long as the finger is to the left of any of the touch-sensitive areas A_1, A_2 and A_3. In this example the controller **1406** responds by applying a low-intensity signal to the electrode **1404**. As soon as the finger **120** crosses the x coordinate value x_1, the controller **1406** detects the finger over the first touch-sensitive area A_1 and starts to apply a medium-intensity signal to the electrode **1404**. Between the areas A_1 and A_2 (between x coordinates x_2 and x_3), the controller again applies a low-intensity signal to the electrode **1404**. The second touch-sensitive area A_2 is processed similarly to the first touch-sensitive area A_1, but the third touch-sensitive area A_3 is processed somewhat differently. As soon as the controller **1406** detects the finger **120** above or in close proximity to the area A_3, it begins to apply the medium-intensity signal to the electrode **1404**, similarly to areas A_1 and A_2. But the user decides to press the touch screen **1400** at a point **x6** within the third area A_3. The controller **1406** detects the finger press (activation of the function assigned to the area A_3) and responds by applying a high-intensity signal to the electrode **1404**.

[0097] Thus the embodiment shown in FIG. **14** can provide the user with a tactile feedback which creates an illusion of a textures surface, although only a single electrode **1404** was used to create the electrosensory stimulus. A residual problem is, however, that the user has to memorize the significance of the several touch-sensitive areas or obtain visual or aural information on their significance.

[0098] FIG. **15** shows a further enhanced embodiment from the one described in connection with FIG. **14**. The embodiment shown in FIG. **15** uses different temporal variations of the intensity of the electrosensory stimulus, wherein the different temporal variations provide the user with a tactile feedback indicating the significance of the touch-sensitive areas.

[0099] The operation of the embodiment shown in FIG. **14** differs from the one described in connection with FIG. **14** in that the controller, here denoted by reference numeral **1506**, applies different temporal variations to the intensity of the signal to the electrode **1404**. In this example, the first touch-sensitive area A_1 is processed similarly to the preceding embodiment, or in other words, the intensity of the electrosensory stimulus depends only on the presence of the finger **120** in close proximity to the area A_1. But in close proximity to areas A_2 and A_3, the controller **1506** also applies temporal variations to the intensity of the electrosensory stimulus. For example the significance (coarsely analogous with a displayed legend) of area A_2 is indicated by a pulsed electrosensory stimulus at a first (low) repetition rate, while the significance of area A_3 is indicated by a pulsed electrosensory stimulus at a second (higher) repetition rate. In an illustrative example, the three touch-sensitive areas A_1, A_2 and A_3 can invoke the three functions in a yes/no/cancel-type user interface, wherein the user can sense the positions of the user interface keys (here: the three touch-sensitive areas) and the indication of an accepted input only via tactile feedback. In other words, the user needs no visual or aural information on the positions of the touch-sensitive areas or on the selected function. The embodiment described in connection with FIG. **15** is particularly attractive in car navigators or the like, which should not require visual attention from their users.

[0100] In the embodiments shown in FIGS. **14** and **15**, when the user's finger **120** has selected the function assigned to area A_3 and the controller CTRL **1406**, **1506** generates the high-intensity electrosensory stimulus via the electrode **1404**, the high-intensity stimulus is sensed via any of the areas A_1, A_2 and A_3. In other words, if one finger of the user presses the area A_3, other finger(s) in close proximity to the other areas A_2 and/or A_3 will also sense the high-intensity stimulus. In cases where this is not desirable, the embodiments shown in FIGS. **14** and **15** can be combined with the multi-electrode embodiment disclosed in connection with FIG. **9**, such that the signal to each of several electrodes (shown in FIG. **9** as items **910***a* through **910***i*) is controlled individually.

[0101] It is readily apparent to a person skilled in the art that, as the technology advances, the inventive concept can be implemented in various ways. The invention and its embodiments are not limited to the examples described above but may vary within the scope of the claims.

REFERENCES

[0102] 1. Gunther, Eric: "*Skinscape: A Tool for Composition in the Tactile Modalifty*" Master's thesis, Massachusetts Institute of Technology 2001, available on the Internet address: http://mf.media.mit.edu/pubs/thesis/guntherMS.pdf

We claim:

1. An apparatus for producing an electrosensory sensation to at least one body member to be stimulated, the apparatus comprising:

one or more conducting electrodes, each conducting electrode being provided with an insulator wherein, when the at least one body member to be stimulated is proximate to the conducting electrode, the insulator prevents flow of direct current from the conducting electrode to the body member to be stimulated and a capacitive coupling over the insulator is formed between the conducting electrode and the at least one body member to be stimulated;

a high-voltage source for applying an electrical input to the one or more conducting electrodes, wherein the electrical input comprises a low-frequency component in a frequency range between 10 Hz and 1000 Hz;

a grounding connection between a reference voltage of the high-voltage source other than the electrical input to the